Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

Lockheed Martin Corporation Petition for Rulemaking; Amendment of Part 15 to Enable More Flexible Use of Radio Frequency Identification Systems in the 433 MHz Band	))))	RM-11651

REPLY OF LUTRON ELECTRONICS CO., INC. TO COMMENTS OF ARRL ON PETITION FOR RULEMAKING

LUTRON ELECTRONICS CO., INC.

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SUMMARY

ARRL correctly points out that Lockheed's proposed removal of the existing Section 15.240 shipping container and corresponding geographic limitations will essentially undermine the single most effective mechanism for mitigating interference from RFID devices operating at 433 MHz. Adoption of the proposed rules would essentially permit a free-for-all operation of Section 15.240 RFID devices in every commercial and residential area throughout the country, not only on a fixed stationary basis but in all mobile/vehicular operations, with no registration requirement and no ability to identify the location of these devices when they are deployed. The existing shipping container and corresponding geographic limitations were the primary safeguard against interference when the Commission adopted Section 15.240. There is absolutely no reason to abandon these critical safeguards at this time.

ARRL is correct that the proposed modification of the RFID duty cycle to a virtual "constant-on" operation will create harmful interference to co-channel emitters. This harmful interference applies just as dramatically to periodic Section 15.231 devices as it does to amateur operations. The proposed duty cycle would not only make all other co-channel devices in the area inoperable for up to 10 seconds at a time during true RFID operation, the proposed rules would, for example, allow a single Section 15.240 device to transmit a beacon-type signal every other second of the day, every day, merely in search of a response. Should such scenario be combined with the removal of the critical Section 15.240 shipping container and geographic limitations, the adoption of the proposed rules would authorize the dramatic and continuous spectrum hogging by an unlimited number of Section 15.240 RFIDs on a neighborhood-by-neighborhood basis across the country, from rural towns to the largest business districts. Many of Lutron's Section 15.231 periodic lighting devices have extremely small latency requirements, so if these new Section 15.240 RFID technologies and applications were to deploy as successfully as Lockheed claims, and if they are used on a constant-on basis as the proposed rules would allow and are operated in every geographic area nationwide as the proposal would allow, the proposed rules would result in RFID operation that "degrades, obstructs or repeatedly interrupts" the proper functioning of hundreds of thousands of fielded lighting products on a routine basis. ARRL is also correct that Lockheed's purported safeguard against interference to co-channel emitters – the proposed LBT protocol – is inadequate and therefore does not justify the initiation of a rulemaking proceeding at the present time.

If no (or relatively few) RFID devices have ever even been deployed under Section 15.240 in the seven years since that rule was adopted, then clearly Savi did not have a viable plan back then, and surely "there is inadequate experience with 433 MHz RFID systems to justify the rule changes" proposed now. The apparent tepid deployment of Section 15.240 433 MHz RFID technology in the past seven years stands in stark contrast to the widespread deployment and commercial success in the past twelve years with respect to Section 15.231 periodic transmitters such as the Lutron Devices, among many other devices in this band. Lockheed's admission regarding the lack of end-user registration calls into question whether the proposed rules are necessary at all.

Finally, if the Commission decides to initiate a rulemaking proceeding in response to the Lockheed Petition, the Notice and any proposed rules must address the issues presented by ARRL and Lutron.

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TO COMMENTS OF ARRL ON PETITION FOR RULEMAKING

Lutron Electronics Co., Inc. ("Lutron"), by undersigned counsel and pursuant to Section 1.405(b) of the Commission's Rules (47 C.F.R. §1.405(b)), hereby submits this Reply to the "Comments" filed by ARRL (a.k.a. the American Radio Relay League, Incorporated) on January 10, 2012 (the "ARRL Comments") which were filed in response to the Petition for Rulemaking (the "Lockheed Petition") submitted to the Commission on October 11, 2011 by Lockheed Martin Corporation ("Lockheed"). As demonstrated herein, Lutron supports and joins ARRL's request that the Commission dismiss or deny the Lockheed Petition. The Lockheed Petition should be dismissed or denied because the proposed rule changes are not only unsupported and unnecessary, they would cause harmful interference to existing devices.

Lutron is an industry leader with respect to the design and manufacture of energy-saving lighting controls and dimmers, automated window treatments, and appliance modules for both residential and commercial applications. For the past twelve years, Lutron has sold lighting control systems that operate at 433-434 MHz ("Lutron Devices") pursuant to the periodic operation requirements set forth in Section 15.231 of the Commission's Rules. Lutron products save energy, and the company estimates that the installed base of its products saves the nation nearly 10 billion kWh of electricity, or approximately $1 billion in utility costs per year. Lutron manufactures more than 16,000 energy-saving products, sold in more than 100 countries around the

world. Lutron estimates that there are hundreds of thousands of Lutron Devices in the field being operated by residential and commercial customers, all of whom rely on 24/7 instant on/off capabilities for day-to-day lighting requirements.

As explained herein, just as ARRL demonstrates that adoption of the rules proposed in the Lockheed Petition would cause unacceptable harmful interference to amateur operations, the initiation of a rulemaking proceeding and the adoption of rules such as those proposed by Lockheed will cause significant and unacceptable harmful interference to the many thousands of periodic transmitters already in operation at 433 MHz pursuant to Section 15.231 of the Commission's Rules. In addition, as ARRL explains, the absence of RFID registration under Section 15.240 to date and apparent non-deployment of any RFID devices under Section 15.240 indicates that the further liberalization of the Section 15.240 rules as proposed by Lockheed is substantially premature. Accordingly, the Lockheed Petition is premature and plainly does not warrant further consideration by the Commission,[1] and as such Lutron supports and joins ARRL's request that the Lockheed Petition be denied or dismissed.

I. ARRL is Correct that Adoption of the Rules Proposed by Lockheed Will Cause Harmful Interference to Existing Emitters Operating at 433 MHz

The Commission should not initiate a rulemaking proceeding here if the proposed rules will cause harmful interference to existing Part 15 emitters. The Commission has acknowledged that "it is appropriate to consider the impact of any rule changes on the users of existing Part 15 devices" and to "consider the risk of interference to incumbent

[1] Section 1.401(e) of the Commission's Rules provides that "Petitions which are moot, premature, repetitive, frivolous, or which plainly do not warrant consideration by the Commission may be denied or dismissed without prejudice to the petitioner." 47 C.F.R. § 1.401(e).

devices" in a rulemaking context.[2] Because in this case the rules proposed by Lockheed will cause significant and unacceptable harmful interference to incumbent Part 15 emitters operating at 433 MHz, and because this proposal is plainly premature given the apparent non-deployment of devices under the existing Section 15.240 rules, the Commission should not at this time initiate a lengthy and protracted rulemaking proceeding which will unnecessarily divert the critical resources of the Commission and strain the resources of industry.

In its Comments, ARRL demonstrates that the proposed rules will cause harmful interference to amateur operations due to (i) the proposed elimination of the shipping container and geographic limitations currently specified in Section 15.240;[3] (ii) the proposed modification of the RFID duty cycle to a virtual "constant-on" operation;[4] and (iii) the inadequacy of Lockheed's proposed Listen-Before-Transmit (LBT) protocol.[5] Lutron submits that the impact on amateur operations is only part of the story as these same factors will equally apply to periodic emitters operating under Section 15.231, such as the devices operated by Lutron, among many others.

First, ARRL correctly points out that the proposed removal of the existing Section 15.240 shipping container and corresponding geographic limitations will essentially undermine the *single most effective mechanism* for mitigating interference from RFID devices operating at 433 MHz. Because the existing Section 15.240 rules limit RFID operation to identifying the contents of commercial shipping containers in areas such as

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[2] Spread Spectrum Transmitters, *First Report and Order*, 15 FCC Rcd 16244, ¶14 (2000).

[3] See ARRL Comments at 11-13.

[4] Id. at 5-6, n.2, p.10-12.

[5] Id. at 13-14.

"ports, rail terminals and warehouses," which is effectively a geographic limitation to transportation hubs, there is currently virtually no geographic overlap between the commercial and residential customers operating hundreds of thousands of Lutron Devices (and many other Section 15.231 devices) and the authorized area of operation for Section 15.240 RFID devices.[6] Adoption of the proposed rules, however, would eliminate the shipping container limitation and the corresponding geographic limitation and essentially permit a free-for-all operation of Section 15.240 RFID devices in *every* commercial and residential area throughout the country.[7] The proposed rules would permit such ubiquitous RFID devices to operate nationwide not only on a fixed stationary basis but in *all* mobile/vehicular operations, with no registration requirement and *no ability to identify the location* of these devices when they are deployed.

In light of the virtual "constant-on" freedom the proposed rules would afford Section 15.240 devices and the interference that would result from such operation across the country (explained below), the Commission should not initiate any rulemaking proceeding that proposes the removal of the existing Section 15.240 shipping container

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[6] Lutron notes that the critical importance of the geographic separation requirement is such that without this geographic separation requirement, even the current Section 15.240 duty cycle requirements would create a harmful interference scenario for Lutron's devices already in the field.

[7] Lutron questions whether the keep-out radius specified for government radar will be an effective anti-interference measure for such facilities in light of the fact that the proposed rules would allow operation of RFIDs for mobile vehicle tracking. Since these devices could be mounted to vehicles that can easily move within the exclusion radius, there is no sufficient mechanism in the proposed rules to give teeth to this "safeguard". In addition, the likelihood of ubiquitous Section 15.240 RFID operation in residential areas under the Lockheed proposal is suggested by Lockheed's reference to IEEE 802.15.4 (Lockheed Petition at 5). Section 1.2 (Purpose) of that standard states that "The purpose of this document is to provide a standard for ultra-low complexity, ultra-low cost, ultra-low power consumption, and low data rate wireless connectivity among inexpensive devices. The raw data rate will be high enough (maximum of 250 kb/s) ***to satisfy a set of simple needs such as interactive toys***...." (emphasis added)

and corresponding geographic limitations. Those limitations were the primary safeguard against interference when the Commission adopted Section 15.240 in 2004. The Commission adopted the Section 15.240 shipping container and corresponding geographic limitations to ensure that Section 15.240 RFID systems "will not operate in close proximity to other users on the same frequency."[8] There is absolutely no reason to abandon these critical safeguards at this time, nor does the Lockheed Petition provide one.

Second, ARRL is correct that the proposed modification of the RFID duty cycle to a virtual "constant-on" operation will create harmful interference to co-channel emitters. This harmful interference applies just as dramatically to periodic Section 15.231 devices as it does to amateur operations. In order to understand the impact of the proposed duty cycle, it is important to first understand that by requiring only a one second silent period between transmissions of up to 10 seconds; this would allow even a single Section 15.240 RFID device in a given area to operate on a virtually uninterrupted basis. Not only would these requirements essentially make all other co-channel devices in the area inoperable for up to 10 seconds at a time during true RFID operation, the proposed rules would, for example, allow a single Section 15.240 device to transmit a beacon-type signal every other second of the day, every day, merely in search of a response.

Should such scenario be combined with the removal of the critical Section 15.240 shipping container and geographic limitations, the adoption of the proposed rules would authorize the dramatic and continuous spectrum hogging by an unlimited number of Section 15.240 RFIDs on a neighborhood-by-neighborhood basis across the country, from rural towns to the largest business districts. This is troubling and unacceptable not

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[8]Review of Part 15 and other Parts of the Commission's Rules, *Third Report and Order*, Docket 01-278, FCC 04-98, ¶16 (2004).

only because it is contrary to the Commission's long-standing policies designed to address increasing spectrum scarcity,[9] but also because there are hundreds of thousands of citizens in all of these areas across the country who rely on uninterrupted operation of their lighting products *every minute of every day* on this very same spectrum.

To further appreciate the impact of the proposed duty cycle on Lutron's Section 15.231 periodic lighting devices, it is important to understand that many of these devices have extremely small latency requirements. Simply put, when a light switch is activated, whether by a child entering her home after school, a restaurant manager before the dinner rush, an employee in a store, a police officer on the night shift, or an employee entering a dim office building stairwell containing an occupancy sensor during a high-rise evacuation, that light *must* turn on immediately; there is simply no alternative.[10] If these new Section 15.240 RFID technologies and applications were to deploy as successfully as Lockheed claims,[11] and if they are used on a constant-on basis as the proposed rules

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[9] Spectrum scarcity has been a significant concern for many years, as the Commission has noted repeatedly, e.g., "Due to the growth in demand for spectrum-based services, many spectrum users seek additional spectrum and it now appears as though spectrum demand is outstripping spectrum supply. Indeed, most prime spectrum has already been assigned to one or more parties, and it is becoming increasingly difficult to find spectrum that can be made available either for new services or to expand existing ones." Spectrum Policy Task Force, Report, ET Docket No. 02-135 (rel. Nov. 2002) (Spectrum Policy Task Force Report).

[10] Because of their short and infrequent transmissions, these Section 15.231 periodic emitters are expressly designed to operate on the assumption that the operating channel is generally clear. These devices initiate transmissions based on events (e.g., a person manually pushing a button, entering a room causing a sensor to transmit, or an occasional automatic timeclock event) which cause a control function to occur such as turning on a light or opening a window shade. Because of the control function requirement and limited allowed transmission times, other Section 15.231 devices also occupy the band for very little time. All this makes the assumption of a clear channel valid.

[11] As ARRL points out, Lockheed provides little explanation as to what new applications and devices would actually result from the rule changes that the Lockheed Petition proposes, suggesting few products are actually being hindered by the existing rules. See ARRL Comments at 10. Lockheed's lack of explanation shows that the proposed rule

would allow and are operated in every geographic area nationwide as the proposal would allow, the proposed rules would result in RFID operation that "degrades, obstructs or repeatedly interrupts"[12] the proper functioning of hundreds of thousands of fielded lighting products on a routine basis. This harmful interference would not only violate the Commission's policies and impact consumers nationwide, it would also require Lutron and other companies to undertake substantial and costly re-engineering and other counter-measures to effectively address.[13]

Third, ARRL is correct that Lockheed's purported safeguard against interference to co-channel emitters – the proposed LBT protocol – is inadequate and therefore does not justify the initiation of a rulemaking proceeding at the present time. This is demonstrated not only in the context of amateur operations but also with respect to Section 15.231 periodic emitters such as Lutron Devices, which are and must continue to be reliable 24/7 event-driven systems. As discussed above, the extremely small latency requirement of many of the Lutron Devices guarantees instant "lights-on" capability when a device is activated. Due to this operational requirement, these fielded Lutron Devices do not employ LBT nor are they required to. Thus, *even if these proposed*

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changes appear unnecessary. Even if Lockheed is correct and many new applications and devices would result from the proposed rules, the resulting harmful interference justifies denying the Lockheed Petition in any event.

[12] See 47 CFR § 15.3 (m) ("Harmful interference. Any emission, radiation or induction that endangers the functioning of a radio navigation service or of other safety services or *seriously degrades, obstructs or repeatedly interrupts* a radiocommunications service operating in accordance with this Chapter.") (emphasis added).

[13] Another example specific to Lutron's product base is that Lutron manufactures a battery powered shade that uses a wake-on radio scheme to achieve a three year+ battery life. The near continuous transmitting that would result from the proposed rules se systems would cause the radios to sense signal strength and be awake constantly trying to decode transmissions reducing battery life to a few months making the battery life time unacceptable to customers.

Section 15.240 RFID devices employ LBT as proposed, once those devices initiate transmission the ability of Lutron Devices in the area to immediately activate will be stymied for up to 10 seconds in length, a commercially unacceptable scenario. If the Commission is inclined to consider the proposed rules in the Lockheed Petition, it should, at a minimum, require Lockheed to withdraw its petition and not re-file until a more effective safeguard is identified that will permit the continued reliable and instant operation of Section 15.231 devices already in the field.

Additionally, the LBT "safeguard" is inadequate because, as proposed, the receiving RFID device is not required to employ LBT for acknowledgement, and communications with the initiating transmitter would be permitted to continue without further LBT for an additional 10 seconds.[14] Thus, even if one assumed that employing LBT for an initiating transmitter provided some benefit (which Lutron does not, as discussed above), the lack of an LBT requirement in the proposed rules for the receiving RFID device poses an unacceptable risk of interference to any fielded Lutron Devices in the area of such receiver.

In sum, in light of the proposed removal of the existing Section 15.240 shipping container and geographic limitations and Lockheed's estimated widespread deployment of new RFID technology, the virtual "constant-on" capabilities afforded by the proposed rules, and the lack of sufficient safeguards to co-channel emitters, harmful interference from the operations proposed by Lockheed will occur. If that occurs, hundreds of thousands of already fielded devices would be impacted and Lutron and other companies would face the prospect of substantial re-engineering costs and the development of other counter-measures to avoid that interference. As such, a rulemaking should not be

[14] Lockheed Petition, Appendix A, p.2.

initiated until these issues are addressed and no interference to existing operations will ensue from any proposed rule changes.

II. ARRL is Correct that the Absence of RFID Registration Under Section 15.240 to Date and Apparent Non-Deployment of Any RFID Devices Under Section 15.240 Indicates that the Further Liberalization of the Section 15.240 Rules as Proposed by Lockheed is Substantially Premature

Unexpectedly, Lockheed disclosed in its petition that "no entity has even submitted a registration to the Commission since this rule [Section 15.240] was passed."[15] Lutron wholly agrees with ARRL that such admission must mean one of two things: "Either manufacturers are not complying with the registration rule (which is most certainly not a comforting circumstance and not a fact that should justify any relaxation of the interference mitigation rules); or (more likely) there are no 433 MHz RFID systems deployed in the band."[16] If no (or relatively few) RFID devices have ever even been deployed under Section 15.240 in the seven years since that rule was adopted, then clearly Savi did not have a viable plan back then, and surely "there is inadequate experience with 433 MHz RFID systems to justify the rule changes"[17] proposed now. The troubling admission by Lockheed with respect to the tepid deployment of Section 15.240 433 MHz RFID technology in the past seven years stands in stark contrast to the widespread deployment and commercial success in the past twelve years with respect to Section 15.231 periodic transmitters such as the Lutron Devices, among many other devices in this band. Lockheed's admission calls into question whether the proposed rules are necessary at all.

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[15] Lockheed Petition at 8.

[16] ARRL Comments at 11.

[17] Id. at n.14.

Given the interference that will result because of the proposed rules to this successful market and the probability that adoption of the proposed rules would require Lutron and other manufacturers to employ costly re-engineering and other counter-measures to effectively address this interference, the Commission should be appropriately cautious about initiating a rulemaking proceeding until it can be demonstrated that there is enough data in the area of 433 MHz RFID operation under Section 15.240 to warrant further modifications to this regulation. Lutron respectfully submits that for the above reasons the Lockheed Petition is premature and plainly does not warrant further consideration by the Commission,[18] and therefore should be denied.

III. If the Commission Decides to Initiate a Rulemaking Proceeding in Response to the Lockheed Petition, the Notice and any Proposed Rules Must Address the Issues Presented by ARRL and Lutron

Although for the reasons set forth above Lutron believes that the Commission should not initiate a rulemaking proceeding in response to the Lockheed Petition, in the event that the Commission does issue a Notice of Proposed Rulemaking ("Notice") the proposed rules should not simply consist of an unedited version of Lockheed's suggestions. Rather, if a Notice is issued, Lutron respectfully submits as follows:

- The Commission should tentatively conclude that the proposed rules should not be adopted (and if adopted not become effective) unless and until there is sufficient data demonstrating (i) that 433 MHz RFID systems have been widely deployed under the current Section 15.240 rules, and (ii) that such systems have been demonstrated to have not caused interference to amateur operations and Section 15.231 emitters, and (iii) that any manufacturers of such RFID systems have fully complied with the Section 15.240 registration requirements.

- The proposed rules must expressly protect amateur operations and Section 15.231 periodic emitters from harmful interference as described by ARRL and Lutron, and the Commission should tentatively conclude that any rules which do not afford such interference protection to these emitters are contrary to the public interest. To the extent necessary to confirm such interference protection for amateur operations and Section 15.231 periodic emitters:

[18] See Section 1.401(e).

- The Commission should not propose removal of the existing Section 15.240 shipping container and geographic limitations.

- The Commission should not propose a modified duty cycle which permits essentially "constant-on" operation of 433 MHz RFID systems and thus prohibits critical 24/7 instant on/off capabilities for Section 15.231 devices with small latency requirements.

- The Commission should not rely on the proposed LBT "safeguard" as an interference mitigation technique in light of the facts presented by ARRL and Lutron in their comments, and instead ensure that any safeguards allow amateur operations and Section 15.231 emitters to operate in a manner unaffected by the proposed rules.

- To further mitigate interference, in no event should the Commission propose to allow the mobile operation of RFID transmitters pursuant to the proposed rules.

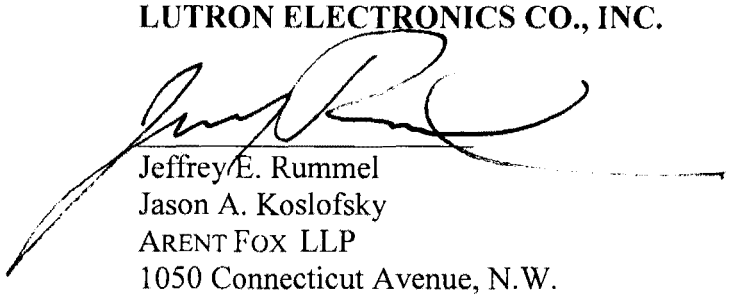
- The Commission should not propose removal of the existing Section 15.240 end user registration requirement for 433 MHz RFID devices.

IV. Conclusion

WHEREFORE, for the foregoing reasons, Lutron supports and joins ARRL's request that the Commission dismiss or deny the Lockheed Petition.

Respectfully submitted,

LUTRON ELECTRONICS CO., INC.



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Dated: January 25, 2012

CERTIFICATE OF SERVICE

I, Jason A. Koslofsky, certify that on January 25, 2012, a copy of the REPLY OF LUTRON ELECTRONICS CO., INC. was sent via First Class mail to the following:

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